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Abstract

UO_2-Na SYSTEM-RELEASE OF FISSION PRODUCTS

S. Ferrari
Divisione Tecnologica, Comitato Nazionale per l'Energia Nucleare (C.N.E.N.), Casaccia (Roma), Italia
C. Lepscky and G. Segre
Divisione Fisica dei Reattori, Comitato Nazionale per l'Energia Nucleare (C.N.E.N.), Casaccia (Roma), Italia

The problem of fission products release from UO_2 particles has been studied under the program relating to the development of a ceramic fuel for fast, sodium-cooled reactors.

In order to proceed with the investigation of the following effects:

(a) decontamination of the fuel due to the release of fission particles from the grains;

(b) breakdown of particles provoked by the formation of fission products;

(c) loss of fissionable materials due to surface evaporation phenomena related to the recoil;

the following operations were carried out:

(1) Calculation of the production of each fission product under conditions as similar as possible to the actual operating conditions. To this end, the 280 equations representing the most significant fission products were solved on the IBM-704 computer.

(2) Study of the phenomena related to the subsequent "history" of the fission products, i.e., in this particular case, recoil and evaporation.

(3) Irradiation experiments and post-irradiation analyses of UO_2 particles of different sizes, with a view to comparing the theoretical estimates with experimental data.

In view of the considerable importance of gaseous fission products, a large number of experiments are being conducted in this particular sector.

This paper does not describe a complete research, but is rather a first attempt to thoroughly investigate the problem.